

THE INVENTOR CLAIMS:

1. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

4 SiO_2 in an amount ranging from about 46.0 to about 71.0
weight percent,

6 Al_2O_3 in an amount ranging from about 9.0 to about 26.0
weight percent,

8 Na_2O in an amount ranging from about 0 to about 5.80 weight
percent,

10 K_2O in an amount ranging from about 0 to about 5.70 weight
percent,

12 CaO in an amount ranging from about 3.76 to about 10.5
weight percent,

14 MgO in an amount ranging from about 1.84 to about 10.5
weight percent,

16 $\text{Fe}_2\text{O}_3 + \text{FeO}$ in an amount ranging from about 4.64 to about
15.5 weight percent, and

18 TiO_2 in an amount ranging from about 0.72 to about 3.0
weight percent.

2. The batch blend of Claim 1, wherein the resulting
2 composition is essentially free of Na_2O and K_2O .

3. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

4 SiO_2 in an amount of about 46.23 weight percent,
6 Al_2O_3 in an amount of about 25.91 weight percent,
8 Na_2O in an amount of about 2.40 weight percent,
10 K_2O in an amount of about 0.82 weight percent,
12 CaO in an amount of about 8.27 weight percent,
14 MgO in an amount of about 4.06 weight percent,
16 $\text{Fe}_2\text{O}_3 + \text{FeO}$ in an amount of about 10.22 weight percent,
18 TiO_2 in an amount of about 1.58 weight percent,
20 ZrO_2 in an amount of about 0.01 weight percent,
22 P_2O_5 in an amount of about 0.28 weight percent, and
24 MnO in an amount of about 0.23 weight percent.

4. The batch blend of Claim 3, wherein the resulting
2 composition is essentially free of ZrO_2 .

5. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO_2 in an amount of about 61.03 weight percent,

4 Al_2O_3 in an amount of about 11.71 weight percent,

Na_2O in an amount of about 2.35 weight percent,

6 K_2O in an amount of about 0.80 weight percent,

CaO in an amount of about 8.10 weight percent,

8 MgO in an amount of about 3.97 weight percent,

Fe_2O_3+FeO in an amount of about 9.99 weight percent,

10 TiO_2 in an amount of about 1.55 weight percent,

ZrO_2 in an amount of about 0 weight percent,

12 P_2O_5 in an amount of about 0.27 weight percent, and

MnO in an amount of about 0.23 weight percent.

6. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 64.95 weight percent,

4 Al₂O₃ in an amount of about 11.13 weight percent,

Na₂O in an amount of about 2.24 weight percent,

6 K₂O in an amount of about 2.24 weight percent,

CaO in an amount of about 3.76 weight percent,

8 MgO in an amount of about 3.77 weight percent,

Fe₂O₃+FeO in an amount of about 9.51 weight percent,

10 TiO₂ in an amount of about 1.47 weight percent

ZrO₂ in an amount of about 0.01 weight percent,

12 P₂O₅ in an amount of about 0.70 weight percent, and

MnO in an amount of about 0.22 weight percent.

7. The batch blend of Claim 6, wherein the resulting
2 composition is essentially free of ZrO₂.

8. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

4 SiO_2 in an amount of about 53.69 weight percent,

6 Al_2O_3 in an amount of about 13.84 weight percent,

8 Na_2O in an amount of about 2.79 weight percent,

10 K_2O in an amount of about 0.95 weight percent,

12 CaO in an amount of about 9.61 weight percent,

14 MgO in an amount of about 4.71 weight percent,

16 $\text{Fe}_2\text{O}_3 + \text{FeO}$ in an amount of about 11.87 weight percent,

18 TiO_2 in an amount of about 1.83 weight percent,

20 ZrO_2 in an amount of about 0 weight percent,

22 P_2O_5 in an amount of about 0.38 weight percent, and

24 MnO in an amount of about 0.33 weight percent.

9. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 55.25 weight percent,

4 Al₂O₃ in an amount of about 18.25 weight percent,

Na₂O in an amount of about 2.30 weight percent,

6 K₂O in an amount of about 1.80 weight percent,

CaO in an amount of about 8.38 weight percent,

8 MgO in an amount of about 3.97 weight percent,

Fe₂O₃+FeO in an amount of about 8.50 weight percent,

10 TiO₂ in an amount of about 1.09 weight percent,

ZrO₂ in an amount of about 0.31 weight percent,

12 P₂O₅ in an amount of about 0.20 weight percent, and

MnO in an amount of about 0.18 weight percent.

10. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 67.55 weight percent,

4 Al₂O₃ in an amount of about 9.76 weight percent,

Na₂O in an amount of about 1.96 weight percent,

6 K₂O in an amount of about 0.67 weight percent,

CaO in an amount of about 6.74 weight percent,

8 MgO in an amount of about 3.30 weight percent,

Fe₂O₃+FeO in an amount of about 8.32 weight percent,

10 TiO₂ in an amount of about 1.28 weight percent,

ZrO₂ in an amount of about 0.01 weight percent,

12 P₂O₅ in an amount of about 0.22 weight percent, and

MnO in an amount of about 0.19 weight percent.

11. The batch blend of Claim 10, wherein the resulting
2 composition is essentially free of ZrO_2 .

12. A batch blend to produce a glass composition useful for
2 forming glass fibers of high heat resistance, comprising:

4 SiO_2 in an amount of about 70.02 weight percent,
6 Al_2O_3 in an amount of about 10.14 weight percent,
8 Na_2O in an amount of about 2.03 weight percent,
10 K_2O in an amount of about 0.01 weight percent,
12 CaO in an amount of about 6.53 weight percent,
MgO in an amount of about 4.26 weight percent,
 $Fe_2O_3 + FeO$ in an amount of about 5.26 weight percent,
 TiO_2 in an amount of about 1.33 weight percent,
 ZrO_2 in an amount of about 0 weight percent,
 P_2O_5 in an amount of about 0 weight percent, and
MnO in an amount of about 0 weight percent.

13. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 46.47 weight percent,

4 Al₂O₃ in an amount of about 25.91 weight percent,

Na₂O in an amount of about 2.41 weight percent,

6 K₂O in an amount of about 0.95 weight percent,

CaO in an amount of about 8.31 weight percent,

8 MgO in an amount of about 4.08 weight percent,

Fe₂O₃+FeO in an amount of about 10.27 weight percent, and

10 TiO₂ in an amount of about 1.60 weight percent.

14. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 66.92 weight percent,

4 Al₂O₃ in an amount of about 11.42 weight percent,

Na₂O in an amount of about 2.59 weight percent,

6 K₂O in an amount of about 2.59 weight percent,

CaO in an amount of about 3.81 weight percent,

8 MgO in an amount of about 4.01 weight percent,

Fe₂O₃+FeO in an amount of about 8.66 weight percent, and

10 TiO₂ in an amount of about 0.72 weight percent.

15. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 55.50 weight percent,

4 Al₂O₃ in an amount of about 18.33 weight percent,

Na₂O in an amount of about 2.31 weight percent,

6 K₂O in an amount of about 1.81 weight percent,

CaO in an amount of about 8.42 weight percent,

8 MgO in an amount of about 3.99 weight percent,

Fe₂O₃+FeO in an amount of about 8.54 weight percent, and

10 TiO₂ in an amount of about 1.10 weight percent.

16. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

4 SiO_2 in an amount of about 67.83 weight percent,

6 Al_2O_3 in an amount of about 9.80 weight percent,

8 Na_2O in an amount of about 1.97 weight percent,

10 K_2O in an amount of about 0.67 weight percent,

CaO in an amount of about 6.77 weight percent,

8 MgO in an amount of about 3.31 weight percent,

Fe₂O₃+FeO in an amount of about 8.36 weight percent, and

10 TiO_2 in an amount of about 1.29 weight percent.

17. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

4 SiO_2 in an amount of about 70.31 weight percent,

6 Al_2O_3 in an amount of about 10.18 weight percent,

8 Na_2O in an amount of about 2.03 weight percent,

10 K_2O in an amount of about 0.01 weight percent,

CaO in an amount of about 6.55 weight percent,

8 MgO in an amount of about 4.27 weight percent,

10 $\text{Fe}_2\text{O}_3 + \text{FeO}$ in an amount of about 5.28 weight percent, and

10 TiO_2 in an amount of about 1.37 weight percent.

18. The blend according to Claim 13, wherein the batch is
2 substantially free of TiO_2 and is resistant to heat and fire for a
substantial period of at least three hours to prevent burn-through
4 by the conversion of at least a portion of the fibers into a fiber
mat of ceram glass.

19. The blend according to Claim 14, wherein the batch is
2 substantially free of TiO_2 and is resistant to heat and fire for a
substantial period of at least three hours to prevent burn-through
4 by the conversion of at least a portion of the fibers into a fiber
mat of ceram glass.

20. The blend according to Claim 17, wherein the batch is
2 substantially free of TiO_2 and is resistant to heat and fire for a
substantial period of at least three hours to prevent burn-through
4 by the conversion of at least a portion of the fibers into a fiber
mat of ceram glass.

21. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

4 SiO_2 in an amount ranging from about 49.0 to about 76.0
4 weight percent,

6 B_2O_3 in an amount ranging from about 0 to about 9 weight
6 percent,

8 Li_2O in an amount ranging from about 0 to about 9 weight
8 percent,

10 Al_2O_3 in an amount ranging from about 2.0 to about 26.0
10 weight percent,

12 Na_2O in an amount ranging from about 0 to about 12.0
12 weight percent,

14 K_2O in an amount ranging from about 0 to about 6.0 weight
14 percent,

16 CaO in an amount ranging from about 3.0 to about 15.0
16 weight percent,

18 MgO in an amount ranging from about 2.0 to about 15.0
18 weight percent,

20 $\text{Fe}_2\text{O}_3 + \text{FeO}$ in an amount ranging from about 1.0 to about
20 18.0 weight percent,

22 TiO_2 in an amount ranging from about 0 to about 4.0 weight
22 percent, and

24 P_2O_5 in an amount ranging from about 0 to about 4.0
24 weight percent.

22. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 67.55 weight percent,

4 Al₂O₃ in an amount of about 9.76 weight percent,

Na₂O in an amount of about 0.67 weight percent,

6 B₂O₃ in an amount of about 1.96 weight percent,

CaO in an amount of about 6.74 weight percent,

8 MgO in an amount of about 3.30 weight percent,

Fe₂O₃+FeO in an amount of about 8.32 weight percent,

10 TiO₂ in an amount of about 1.28 weight percent,

ZrO₂ in an amount of about 0.01 weight percent,

12 P₂O₅ in an amount of about 0.22 weight percent, and

MnO in an amount of about 0.19 weight percent.

23. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 67.55 weight percent,

4 Al₂O₃ in an amount of about 9.76 weight percent,

Na₂O in an amount of about 0.67 weight percent,

6 Li₂O in an amount of about 1.96 weight percent,

CaO in an amount of about 6.74 weight percent,

8 MgO in an amount of about 3.30 weight percent,

Fe₂O₃+FeO in an amount of about 8.32 weight percent,

10 TiO₂ in an amount of about 1.28 weight percent,

ZrO₂ in an amount of about 0.01 weight percent,

12 P₂O₅ in an amount of about 0.22 weight percent, and

MnO in an amount of about 0.19 weight percent.

24. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 67.55 weight percent,

4 Al₂O₃ in an amount of about 9.76 weight percent,

Na₂O in an amount of about 0.67 weight percent,

6 K₂O in an amount of about 1.96 weight percent,

CaO in an amount of about 6.74 weight percent,

8 MgO in an amount of about 3.30 weight percent,

Fe₂O₃+FeO in an amount of about 8.32 weight percent,

10 TiO₂ in an amount of about 1.28 weight percent,

ZrO₂ in an amount of about 0.01 weight percent,

12 P₂O₅ in an amount of about 0.22 weight percent, and

MnO in an amount of about 0.19 weight percent.

25. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

4 SiO_2 in an amount of about 49.0 weight percent,

4 Al_2O_3 in an amount of about 23.0 weight percent,

6 B_2O_3 in an amount of about 2.35 weight percent,

6 Na_2O in an amount of about 1.04 weight percent,

8 CaO in an amount of about 8.31 weight percent,

8 MgO in an amount of about 4.08 weight percent,

10 $\text{Fe}_2\text{O}_3 + \text{FeO}$ in an amount of about 10.27 weight percent, and

10 TiO_2 in an amount of about 1.59 weight percent.

26. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 67.36 weight percent,

4 Al₂O₃ in an amount of about 9.76 weight percent,

Li₂O in an amount of about 2.86 weight percent,

6 Na₂O in an amount of about 1.00 weight percent,

CaO in an amount of about 5.28 weight percent,

8 MgO in an amount of about 3.80 weight percent,

Fe₂O₃+FeO in an amount of about 8.46 weight percent, and

10 TiO₂ in an amount of about 1.48 weight percent.

27. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 65.16 weight percent,

4 Al₂O₃ in an amount of about 11.18 weight percent,

B₂O₃ in an amount of about 3.01 weight percent,

6 CaO in an amount of about 7.14 weight percent,

MgO in an amount of about 3.99 weight percent,

8 Fe₂O₃+FeO in an amount of about 8.95 weight percent, and

TiO₂ in an amount of about 0.57 weight percent.

28. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 56.01 weight percent,

4 Al₂O₃ in an amount of about 13.92 weight percent,

B₂O₃ in an amount of about 4.01 weight percent,

6 Na₂O in an amount of about 2.92 weight percent,

K₂O in an amount of about 0.96 weight percent,

8 CaO in an amount of about 8.40 weight percent,

Fe₂O₃+FeO in an amount of about 11.94 weight percent, and

10 TiO₂ in an amount of about 1.84 weight percent.

29. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO_2 in an amount of about 66.51 weight percent,

Li_2O in an amount of about 3.41 weight percent,

CaO in an amount of about 6.41 weight percent,

8 MgO in an amount of about 2.99 weight percent, and

$\text{Fe}_2\text{O}_3 + \text{FeO}$ in an amount of about 8.53 weight percent.

30. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO_2 in an amount of about 68.00 weight percent,

4 Al_2O_3 in an amount of about 9.06 weight percent,

B_2O_3 in an amount of about 2.01 weight percent,

6 Na_2O in an amount of about 2.33 weight percent,

K_2O in an amount of about 0.42 weight percent,

8 CaO in an amount of about 6.23 weight percent,

MgO in an amount of about 3.06 weight percent,

10 $\text{Fe}_2\text{O}_3 + \text{FeO}$ in an amount of about 7.70 weight percent, and

TiO_2 in an amount of about 1.19 weight percent.

31. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 65.24 weight percent,

4 Al₂O₃ in an amount of about 2.50 weight percent,

B₂O₃ in an amount of about 6.00 weight percent,

6 Na₂O in an amount of about 13.00 weight percent,

CaO in an amount of about 6.70 weight percent,

8 MgO in an amount of about 1.85 weight percent,

Fe₂O₃+FeO in an amount of about 4.01 weight percent, and

10 TiO₂ in an amount of about 0.70 weight percent.

32. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 67.50 weight percent,

4 Al₂O₃ in an amount of about 9.34 weight percent,

Li₂O in an amount of about 2.31 weight percent,

6 K₂O in an amount of about 0.81 weight percent,

CaO in an amount of about 8.41 weight percent,

8 MgO in an amount of about 2.00 weight percent,

Fe₂O₃+FeO in an amount of about 8.53 weight percent, and

10 TiO₂ in an amount of about 1.10 weight percent.

33. A batch blend to produce a glass composition useful
2 for forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 46.47 weight percent,

4 Al₂O₃ in an amount of about 25.91 weight percent,

B₂O₃ in an amount of about 2.41 weight percent,

6 Na₂O in an amount of about 2.55 weight percent,

CaO in an amount of about 8.31 weight percent,

8 MgO in an amount of about 4.08 weight percent, and

Fe₂O₃+FeO in an amount of about 10.27 weight percent.

34. A batch blend to produce a glass composition useful for
2 forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 66.92 weight percent,

4 Al₂O₃ in an amount of about 11.42 weight percent,

Na₂O in an amount of about 2.59 weight percent,

6 B₂O₃ in an amount of about 4.24 weight percent,

CaO in an amount of about 4.02 weight percent,

8 MgO in an amount of about 0.81 weight percent, and

Fe₂O₃+FeO in an amount of about 10.00 weight percent.

35. A batch blend to produce a glass composition useful for
2 forming glass fibers of high heat resistance, comprising:

SiO₂ in an amount of about 70.31 weight percent,

4 Al₂O₃ in an amount of about 8.30 weight percent,

Na₂O in an amount of about 2.03 weight percent,

6 B₂O₃ in an amount of about 1.01 weight percent,

CaO in an amount of about 6.55 weight percent,

8 MgO in an amount of about 3.27 weight percent, and

Fe₂O₃+FeO in an amount of about 8.53 weight percent.